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**HONEYWELL
INFORMATION
SYSTEMS INC.**

L16-92

TITLE:

No. 43A232439

ENGINEERING PRODUCT SPECIFICATION PART 1 FOR
DHC601 DOCUMENT HANDLER CHANNEL (DRD236 Reader/
Sorter)

Total Pages **25**

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REVISION RECORD

REVISION LETTER	DATE	PAGES AFFECTED	APPROVALS	AUTHORITY
A ISSUE	AUG 03 1971	SH. 1,2,2.1,3-7,7.1 8-23F	<i>[Signature]</i>	EWA 13380
B Rev.	JAN 21 1972	Rev. Sh. 1,7,7.1,12, 18,22; Ret. & Rev. Sh. 10,13,15,19	Dec. 16, 1971 <i>[Signature]</i>	COZEC-00-2136

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2.3.5 Terminate Status

Terminate status will be stored and the Terminate Interrupt set when any of the following conditions occur:

- a) The DRD236 indicates the end of data transmission for one document.
- b) The Indirect Data Control Word (ICW) runs out (TY1), or an exhausted ICW (TY0) is accessed.
- c) An error condition is detected by the channel.
- d) A software terminate, via the Control Character Word (CCW).
- e) The peripheral enters the Ready state.

2.3.6 Inactive

The channel enters the INACTIVE mode when all transactions are complete and no more data is to be transferred.

3.0 SOFTWARE INTERFACE REQUIREMENTS

All information on the H-355 IOM Bus which is software generated or returned to the software, appears on the bus in core storage format. This includes PCW's, BAW's, CCW's, ICW's, Status Words, and Queue Words.

3.1 Status and Control Words

3.1.1 Peripheral Control Word (PCW)

The Peripheral Control Word (PCW) defines the operation to be performed by the peripheral. The pocket select/wraparound and op-code fields of the PCW are stored by the channel for the duration of the instruction.

The PCW for the DHC601 Document Handler channel will be sent to the channel on the output data lines of the IOM Bus and will have the following format.

0	1	7	8	9	16	17	22	23	24	35
P	Pocket and Wraparound		M B Z	Op-Code		MBZ		M	MBZ	

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- Bit Position 0 - Odd parity for the op-code, pocket, and wraparound fields.
- Bit Position 1-7 - Dual purpose bits when a pocket command mode is set (Bit 9 or 14), Bits 3-7 will contain the pocket select character. Bits 1-7 will contain the wraparound data when in the wrap-around mode.
- Bit Position 8 - Must be zero - reserved for op-code extension.
- Bit Position 9-17 - Op-code bits.
- Bit 9 = Sorter Pocket Light
- Bit 10 = Batch Count Plus One
- Bit 11 = Start - Feed-A
- Bit 12 = Start - Feed-B
- Bit 13 = Stop - Feed
- Bit 14 = Pocket Select
- Bit 15 = Request Status
- Bit 16 = Wraparound

B

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Bit Position 17-22 - Must be zero.

Bit Position 23 - Mask bit.

Bit Position 24-35 - Must be zero.

Mask (23) - When set to zero in a PCW, the channel responds normally. When set to one in a PCW, the channel is masked and disconnects; the remainder of the PCW is then ignored.

When a bit is set in the op-code field, the channel performs the instruction indicated. The Feed instruction bits and the wrap-around bit are exclusive bits and only one of these bits should be set at a time. The Sorter Pocket Light, Batch Count plus one, and Request Status bits may be ored with other instruction bits.

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Read Terminate (RTERM) The Read Terminate status bit is set after each document is read.

Too Late To Pocket (STLP) The Too Late To Pocket status bit is set whenever the document has reached the reject gate without the receipt of a valid pocket select. The document is rejected. The channel will stop document feeding.

B

Double Document Detect (SDDL) This status bit is set when multiple or underspaced documents are at the first read head. Note: The document is not rejected by the sorter when on-line. The channel will stop document feeding.

B

Document Jam (SJAM) This status bit is set when a document jam is detected by the device. The feeder is stopped and the transport is turned off at the appropriate jam location. Note: Pocket selection is still under software control for those documents past the read head.

Batch Ticket Detect Level (BTDL) This status bit is set when the device hardware detects a batch ticket item exiting the feeder area and is in path. The feeder is stopped by the channel. The sorter goes not ready.

B

Batch Number Count Enable (BCEL) This status when set signifies that the endorser is not in an advanced cycle. This status bit will be reset following the receipt of a BC+1 command. Once the BC+1 cycle is complete, the status will again be set.

Document Missort (SMRT) This status bit is set when a missort has occurred. The sorter goes not ready and functions as SJAM above. This status is also set in case of a pocket buffer overflow (3 items). The pocket which contains the missorted document will be indicated with the pocket number light flashing.

The Status Stored bit is set each time the channel stores either peripheral or channel status conditions.

The Tally Runout (TYO) status bit is set whenever the tally is found to be zero.

The Pre-Tally Runout (TY1) status bit is set when the tally is decremented from one to zero.

The Wraparound Mode (WRAP) status bit is set when the Wraparound command is executed and the wraparound cycle terminates.

The Transfer Timing Error (XFER) status is set when a new character is received by the channel from the sorter before the old character can be processed. Note: This condition can occur when a hardware failure exists or when a DHC601 channel cannot obtain 3 IØ cycles in 300 microseconds after the character is read.

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0 1	2 3	10 11 12	13	16 17
MBZ	1	BAW Address	SW Tab	Data Character

CCW Address Word (MICR only)

- Bits 0-1 must be zero.
- Bit 2 must be one to signal double precision (36 bits).
- Bit 3-10 base address of the CCW table, loaded by LDEX.
- Bits 11 and 12 are the contents of the Switch Table Register. The first CCW access after the LDEX uses the value obtained from the LDEX. Succeeding CCW accesses use the value as modified by the previous CCW's. At the end of each document, the Switch Table Register will be loaded with the original LDEX values via a software generated load external. Succeeding documents will access the first CCW with the BAW bits obtained from the last LDEX, and succeeding CCW accesses for each document will have bits 11 and 12 as modified by the previous CCW.
- Bits 13-16 are contents of the data register of the character just read (MICR characters only).
- Bit 17 must be zero since the CCW is 36 bits.

The generated CCW address selects a CCW word pair from the CCW table located in core. The CCW table will have 16 word pairs corresponding to the 16 different characters read from the MICR or OCR documents. The CCW word pair will have the following format:

0	8 9 10 11 12	17 18	25 26 27	35
Command	0	SW Tab	CCW Status	MBZ
				P
				New Character

- Bits 0-8 will contain the command bits in the following order
 - Bit 0 - Not used, must be zero.
 - Bit 1 - Don't store.
 - Bit 2 - Store Q character and status.
 - Bit 3 - Terminate via software.
 - Bit 4 - Reset Interval Counter.
 - Bit 5 - Reset Total Counter.
 - Bit 6 - Reset Status Register.
 - Bit 7 - Switch Table.
 - Bit 8 - Replace read data character with new character, CCW bits 27-35.

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- Bit 9 not used, must be zero.
- Bits 10-11 contain Switch Table Bits loaded into Switch Table Register when switch table command bit is set in CCW (Bit 7).
- Bits 12-17 contain CCW Status as loaded by software.
- Bits 18-28 not used, must be zero.
- Bit 26 Parity (odd one) for new character.
- Bits 27-35 contain new 6 or 9 bit character as identified by software in the Data ICW.

3.1.5.2 OCR Documents

The CCW Address Word will have a different format when reading OCR documents. No Switch Table bits will be allowed. The OCR CCW address format shall be as follows:

0	1	2	3	9	10	16	17
MBZ	L	BAW	OCR DATA	0			

- Bits 0-1 must be zero.
- Bit 2 must be one to signal double precision (36 bits).
- Bits 3-9 base address of the CCW table, loaded by LDEX.
- Bits 10-16 are the contents of the data register of the OCR character just read (7 bits).
- Bit 17 must be zero, since the CCW is double word.

The generated CCW address selects a CCW word pair from the OCR CCW table located in core. The CCW Table will require 128 word pairs corresponding to the seven bit code allowed for OCR characters. The OCR CCW word pair will have the same format as the MICR CCW with the exception that no switch table bits will be allowed.

0	8	9	11	12	17	18	25	26	27	35
COMMAND	MBZ	CCW STATUS	MBZ	P	NEW CHAR.					

The OCR CCW Word can convert the 7 bit ASCII character read to a 6 or 9 bit code. The Replace character CCW command can be used for OCR data to perform this conversion allowing the 6 or 9 bit new character of the CCW to be substituted for the 7 bit ASCII character. Que characters must be converted to a 6-bit code since the Q-Status word allows only 6 bits for the Q-character.

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- The channel forms the address for the CCW access from the BAW, the Switch Table Register, and the Data Register.
- The channel loads the CCW from the address formed above, direct 36.
- The channel processes the CCW in the following sequential steps:

1) "OR's" CCW Status bits 12-17 to the CCW Status Register. "REPLACE's" the received data character by the replace character, CCW bits 27-35, if the "REPLACE" command bit is set.

2) If the "DON'T STORE" command bit is set, the data character is not stored, and the Interval Counter and Total Counter is not incremented.

If the "DON'T STORE" command bit is not set the data character is stored indirect 6 to the ICW Base Address +2. The Interval Counter is incremented, if the "STORE Q" command bit is not set. The Total Counter is incremented.

3) "STORE-Q" command bit set stores the new or old data character, the Status Register, the Interval Counter, and the Total Counter indirect 36 bit to the ICW base address +4.

4) "TERMINATE" command bit allows a program halt of the read at any point in the document. The channel will first store the Q-Status register and counters with bits 0-5 zero. All further data transfer for the document in transit will cease. The channel will then process the terminate status and interrupt at the end of the document.

5) "RESET INTERVAL COUNTER," "RESET TOTAL COUNTER," and "RESET CCW STATUS REGISTER" command bits allow program control over these counters and register. The counters and register will also reset after the terminate status is stored.

6) "SWITCH TABLE" command bit causes the address for the CCW access to be modified by bits 10 and 11 of the present CCW. The Switch Table bits will be stored until modified by further Switch Table commands, or until reset after terminate status is stored. A maximum of four tables will be allowed.

Any or all of the above commands can be executed in one CCW cycle. The above cycle will be repeated for each character read.

The DRD236 document handler continues to read documents until a terminate or error condition occurs.

- Start-Feed-B (PCW bit 12 set)

Starts feeding documents and reads from OCR head. The sequence is the same as for "Start-Feed-A."

- Stop Feed (PCW bit 13 set)

Stops feeding of documents, however, documents in transit between the feeder and the read head will continue to be read. The number of documents will depend upon what type of documents are being read, that is, OCR or MICR. This is due to the different spacing between the feeder and the two read heads. The channel will interrupt (Level 2) and store status when no more documents are to be read.

- Pocket Command (PCW bit 14 set)

Enables the pocket select lines, as supplied by software in positions 3 through 7 of the PCW word, to be sent to the DRD236 Reader/Sorter for the last document read.

- Request Status (PCW bit 15 set)

This instruction bit may be issued any time and will store the channel and peripheral status into the status word location and causes a Level 2 interrupt. If the channel is transferring data, the command will be ignored until **after terminate status** is stored.

- Wraparound (PCW bit 16 set)

This instruction bit should be set when the channel is in the standby or masked state. The document handler is not required to be on line, or in the ready condition. The feature is intended as a test and diagnostic aid.

The wraparound instruction bit allows the PCW bits 1 through 7 to be wrapped around as an input character causing a complete BAW-CCW cycle. Analysis of the returned data will be required to verify the Status Register, Interval, and Total Counters. Status bits 03 through 08 are enabled by the Wraparound command.

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4.0 HARDWARE INTERFACE REQUIREMENTS

4.1 DRD236 Document Handler Interface

The DHC601 Document Handler channel will interface the DRD236 Document Handler Reader/Sorter directly.

The channel shall be designed to interface the DRD236 Document Handler (Burroughs B9134 Document Handler) with no hardware changes in the Burroughs device. The purchase specification 59A203170 identifies the functions to be supplied by Burroughs.

4.1.1 Exceptions to Announced Burroughs B9134

Although the channel must interface the DRD236, it is not a requirement that all features announced by Burroughs be used. Known exceptions are listed below:

- Only two read heads will be used. The MICR reader and the First OCR reader.
- No dual reads will be performed. The channel is required to read MICR or OCR documents but not both on the same pass of the document.

4.1.2 DRD236 Cable Interface

The 355 I/O panel shall be designed to interface with the B9134 cable. This cable has a 104 pin connector which must be connected to the 355 I/O connector panel. The connector panel must be modified so that both common peripheral cables and B9134 cables may be missed on the same panel plate. The B9134 Reader/Sorter uses the 104 pin Winchester (Model No. 104SF2A016-573) connector.

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6.2.3.4 Parity Generation

The DRD236 Document Handler does not send parity with the data character. However, character parity will be generated in the channel on the received character, and compared with the parity bit returned by the IOM (4WDEC600AB1 model). If a new character is specified by software in its CCW, odd parity will be provided by software on this character (bit 26 of CCW).

The channel shall check for odd parity on the PCW as follows:

Software generated parity bit in bit position 0 shall be odd parity of the Pocket Select/Wraparound and Op-Code fields.

A parity error will force a terminate before the command is sent to the peripheral and turn on the proper status bit.